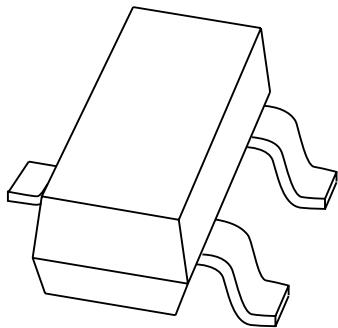


# DATA SHEET



**PBSS4120T**  
20 V, 1 A  
NPN low  $V_{CEsat}$  (BISS) transistor

Product specification

2003 Sep 29

# 20 V, 1 A

## NPN low $V_{CEsat}$ (BISS) transistor

PBSS4120T

### FEATURES

- Low collector-emitter saturation voltage  $V_{CEsat}$
- High collector current capability  $I_C$  and  $I_{CM}$
- High efficiency leading to less heat generation
- Reduced printed-circuit board requirements
- Cost effective alternative to MOSFETs in specific applications.

### APPLICATIONS

- Power management
  - DC/DC conversion
  - Supply line switching
  - Battery charger
  - LCD backlighting.
- Peripheral driver
  - Driver in low supply voltage applications (e.g. lamps and LEDs)
  - Inductive load drivers (e.g. relays, buzzers and motors).

### DESCRIPTION

NPN BISS transistor in a SOT23 plastic package providing ultra low  $V_{CEsat}$  and  $R_{CEsat}$  parameters.  
PNP complement: PBSS5120T.

### MARKING

TYPE NUMBER	MARKING CODE <sup>(1)</sup>
PBSS4120T	*3B

### Note

1. \* = p: made in Hong Kong.
- \* = t: made in Malaysia.
- \* = W: made in China.

### ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PBSS4120T	–	plastic surface mounted package; 3 leads	SOT23

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
$V_{CEO}$	collector-emitter voltage	20	V
$I_C$	collector current (DC)	1	A
$I_{CM}$	peak collector current	3	A
$R_{CEsat}$	equivalent on-resistance	200	$m\Omega$

### PINNING

PIN	DESCRIPTION
1	base
2	emitter
3	collector

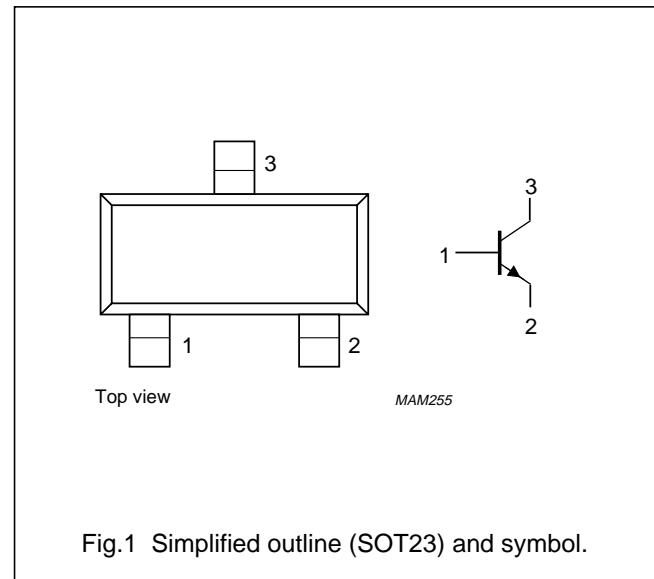


Fig.1 Simplified outline (SOT23) and symbol.

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**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	30	V
$V_{CEO}$	collector-emitter voltage	open base	–	20	V
$V_{EBO}$	emitter-base voltage	open collector	–	5	V
$I_C$	collector current (DC)		–	1	A
$I_{CM}$	peak collector current		–	3	A
$I_{BM}$	peak base current		–	300	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25^\circ\text{C}$ ; note 1	–	300	mW
		$T_{amb} \leq 25^\circ\text{C}$ ; note 2	–	480	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C
$T_{amb}$	operating ambient temperature		–65	+150	°C

**Notes**

1. Device mounted on a FR4 printed-circuit board, single-sided copper, tinplated, standard footprint.
2. Device mounted on a FR4 printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>.

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air; note 1	417	K/W
		in free air; note 2	260	K/W

**Notes**

1. Device mounted on a FR4 printed-circuit board, single-sided copper, tinplated, standard footprint.
2. Device mounted on a FR4 printed-circuit board, single-sided copper, tinplated, mounting pad for collector 1 cm<sup>2</sup>.

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**CHARACTERISTICS** $T_{amb} = 25^\circ\text{C}$  unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0$	—	—	100	nA
		$V_{CB} = 30\text{ V}; I_E = 0; T_j = 150^\circ\text{C}$	—	—	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0$	—	—	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 2\text{ V}; I_C = 100\text{ mA}$	350	470	—	
		$V_{CE} = 2\text{ V}; I_C = 500\text{ mA}$	300	450	—	
		$V_{CE} = 2\text{ V}; I_C = 1\text{ A}$	280	420	—	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 1\text{ mA}$	—	—	80	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	—	—	110	mV
		$I_C = 750\text{ mA}; I_B = 15\text{ mA}$	—	—	200	mV
		$I_C = 1\text{ A}; I_B = 50\text{ mA}; \text{note 1}$	—	—	250	mV
$R_{CEsat}$	equivalent on-resistance	$I_C = 500\text{ mA}; I_B = 50\text{ mA}; \text{note 1}$	—	—	220	$\text{m}\Omega$
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 1\text{ A}; I_B = 100\text{ mA}; \text{note 1}$	—	—	1.1	V
$V_{BEon}$	base-emitter turn-on voltage	$V_{CE} = 2\text{ V}; I_C = 100\text{ mA}$	—	—	0.75	V
$f_T$	transition frequency	$I_C = 100\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$	100	—	—	MHz
$C_c$	collector capacitance	$V_{CB} = 10\text{ V}; I_E = I_e = 0; f = 1\text{ MHz}$	—	—	20	pF

**Note**

1. Pulse test:  $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$ .

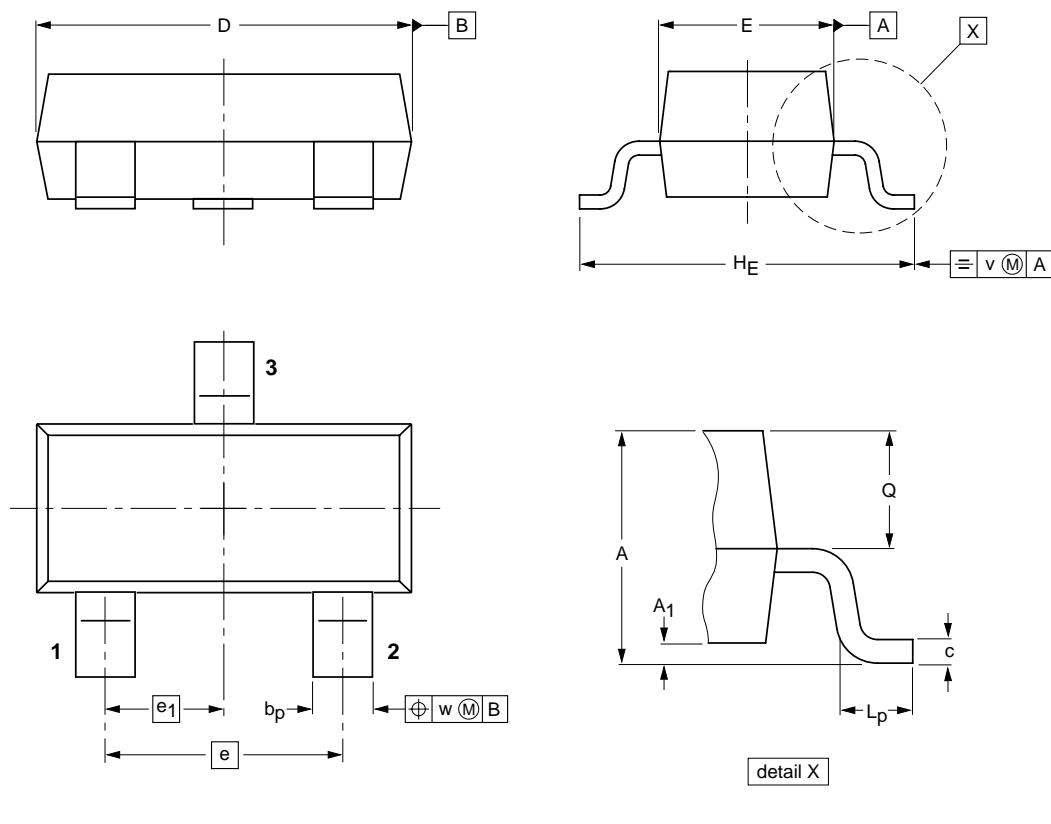
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## PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT23



## DIMENSIONS (mm are the original dimensions)

UNIT	A	$A_1$ max.	$b_p$	c	D	E	e	$e_1$	$H_E$	$L_p$	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT23		TO-236AB				-97-02-28 99-09-13

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LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	DEFINITION
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